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DOCUMENTS

RELATING TO

ROSS WINANS' PATENT

FOR THE

EIGHT-WHEELED CAR.

New-Pork:

 $\rm J\,O\,H\,N\,$ W. AMERMAN, PRINTER, No. 60 William-street.

1856.

DOCUMENTS

RELATING TO

ROSS WINANS' PATENT

FOR THE

EIGHT-WHEELED CAR.

New-Pork:

1856.

Documents relating to Ross Winans' Patent.

(COPY OF THE PATENT.)

The United States of America.

To all to whom these Letters Patent shall come:

Whereas, Ross Winans, a citizen of the United States, hath alleged that he has invented a new and useful improvement in the construction of cars or carriages intended to run upon rail-roads, which improvement he states has not been known or used before his application; hath sworn that he does verily believe that he is the true inventor or discoverer of the said improvement; hath paid into the Treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are, therefore, to grant, according to law, to the said Ross Winans, his heirs, administrators or assigns, for the term of fourteen years from the first day of October, one thousand eight hundred and thirty-four, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Ross Winans himself, in the schedule hereto annexed, and is made a

part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the United States to be hereunto affixed.

Given under my hand, at the city of Washington, this first day of October, in the year of our Lord one thousand eight hundred and thirty-four, and of the Independence of the United States of America the fifty-ninth.

[L. S.]

ANDREW JACKSON.

By the President,

John Forsyth, Secretary of State.

City of Washington, to wit: I do hereby certify that the foregoing Letters Patent were delivered to me on the first day of October, in the year of our Lord one thousand eight hundred and thirty-four, to be examined, that I have examined the same and find them conformable to law, and I do hereby return the same to the Secretary of State, within fifteen days from the date aforesaid, to wit, on the first day of October, in the year aforesaid.

B. F. BUTLER, Attorney General of the United States.

- 10 The Schedule referred to in these Letters Patent, and making part of the same, containing a description, in the words of the said Ross Winans himself, of his improvement in the construction of cars or carriages intended to run upon rail-roads:
- 11 To all whom it may concern:—Be it known, that I, Ross Winans, civil engineer, of the city of Baltimore, in the State of Maryland, have invented a new and useful improvement in the construction of cars or carriages, intended to travel upon rail roads; which improvement is particularly adapted to passenger cars, as will more fully appear by an exposition of the difficulties heretofore experienced in the running of such cars at high velocities, which exposition I think it best to give in this specification, for the purpose of exemplifying the more clearly

the object of my said improvement.

In the construction of all rail-roads in this country, which extend to any considerable distance, it has been found necessary to admit of lateral curvatures, the radius of which is sometimes but a few hundred feet; and it becomes important, therefore, so to construct the cars, as to enable them to overcome the difficulties presented by such curvatures, and to adapt them for running with the least friction practicable, upon all parts of the road. The friction to which I

now allude is that which arises from the

Improvement in the construction of cars or carriages.

Passenger cars.

High velocities, cause of difficulties.

Rail-roads in this 12 country, in view.

Curves of but a few hundred feet radius

constitute the difficul-

with the least friction on all parts of the road. SIR.

I send to you a pamphlet containing a copy of the Patent, which was granted to me on the 1st of October, 1834, and extended for seven years, from the 1st of October, 1848, for what is commonly known as the eight-wheeled car. invite your attention and that of the Board of Directors of the Rail Road Company with which you are connected, to the specification annexed to the Patent, and to the legal decisions in regard to the Patent, which you will find in the pamphlet. I have tried three suits at law upon the Patent. In one I obtained a verdict. In the others, the juries were unable to agree. You will find in the pamphlet, the decisions that have been made by Chief Justice Taney and by Mr. Justice Nelson and Judge Conkling, all of them in my favor. I call your attention particularly to these decisions, and ask that the Board of Directors of your Road may be made acquainted with them, in order that they may fully understand the grounds of my confidence in the justness of the claim which I am now engaged in enforcing before the legal tribunals of my country. I believe that the information afforded by this pamphlet will be new to most of those who control the action of the Rail Road Companies of the United States, and that it will disabuse their minds of very much of the prejudice which they entertain in regard to my claims under my Patent.

Yours respectfully,

ROSS WINANS.

contact between the flanches of the wheels and the rails, which, when it occurs, causes a great loss of power, and a rapid destruction of, or injury to, both the wheel and the rail, and is otherwise injurious.

The high velocities attained by the im-13 provements made in locomotive engines, and which are not only sanctioned but demanded by public opinion, render it necessary that certain points of construction and arrangement, both in the roads and wheels, which were not viewed as important at for mer rates of traveling, should now receive special attention. The greater momentum of the load, and the intensity of the shocks and concussions, which are unavoidable, even under the best constructions, are among those circumstances which must not be neglected, as the liability to accident is thereby not only greatly increased, but the consequences to be apprehended much more serious.

The passenger and other cars in general 14 use upon rail-roads have four wheels, the axles of which are placed from three and a half to five feet apart; this distance being governed by the nature of the road upon which they run, and other considerations.

When the cars are so constructed that the 15 axles retain their parallelism, and are at a considerable distance apart, there is a necessary tendency in the flanches of the wheels to come into contact with the rails, especially on the curvatures of least radius, as the axles then vary more from the direction of the radii. From this consideration, when taken alone, it would appear to be best to place the axles as near to each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves and the planes of the wheels to conform to the line of the rails.

There are, however, other circumstances 16 Other circumstances to be looked at. which must not be overlooked in their constructions. I have already alluded to the

Friction meant is between flanch and

Modern high velocities

make points formerly unimportant, matter for special attention.

Momentum of load and intensity of shocks and concus-sions, not to be neglected, as they render

accidents more probable-consequences more serious.

Common fourwheeled car axles, 35 to 5 feet apart, according to nature of road.

Parallel axles, far apart, bring flanches and rails in contact, on sharp curves.

Therefore, axles near together,

approaching radii of curvature.

Shocks at high velocities.

Perpetual operation of small inequalities in wheels and rails.

Greater distance apart of axles, the less the shocks, &c.

Therefore, axles placed at or near the ends.

Compromise, the result.

Incessant vertical vibrations to be considered.

The nearer the axles the greater the effect of the vertical motion on passengers.

Important to find a mode of combining advantages of near and remote coupling, as regards comfort, safety and economy.

Use of cone attempt- 18 ed, to keep flanch from rail.

Would do at slow speed,

increased force of the shocks from obstructions at high velocities; and whatever care may be taken, there will be inequalities in the rails and wheels, which, though small, are numerous, and the perpetual operation of which produces effects which cannot be disregarded. The greater the distance between the axles, while the length of the body remains the same, the less is the influence of these shocks or concussions; and this has led, in many instances, to the placing them, in passenger cars, at or near their extreme Now, however, a compromise is most commonly made between the evils resulting from a considerable separation and a near approach, as, by the modes of construction now in use, one of the advantages must be sacrificed to the other.

But it is not to the lateral curvatures and inequalities of the road alone, that the foregoing remarks apply. The incessant vibration felt in traveling over a rail-road is mainly dependent upon the vertical motion of the cars, in surmounting those numerous though minute obstructions which unavoidably exist. The nearer the axles are placed to each other, the greater is the effect of this motion upon the passengers, and the greater its power to derange the machinery and the road. It becomes very important, therefore, both as regards comfort, safety and economy, to devise a mode of combining the advantages derived from placing the axles at a considerable distance apart, with those of allowing them to be situated near to each other.

It has been attempted, and with some success, to correct the tendency of the flanches to come into contact with the rails on curved and other parts of the road, by making the tread of the wheel conical; and, if the traveling upon rail-roads was not required to be very rapid, this would so far prove an effectual corrective, as the two rails would find diameters upon the wheels which would

correspond with the difference in length, the constant tendency to deviation being as constantly counteracted by this construction; but at high velocities, the momentum of the body in motion tends so powerfully to carry 19 it in a right line, as to cause the wheel on the longer rail to ascend considerably above that part of the cone which corresponds therewith. The consequence of this is a continued serpentine motion, principally, but not entirely, in a lateral direction; nor is this confined to the curved parts of the road, but it exists to an equal or greater extent upon those which are straight, especially when the axles are near to each other, the irregularities before spoken of constantly changing the direct course of the wheels, whilst there is no general curvature of the rails to counteract it. To avoid this effect, and the unpleasant motion and tendency to derangement consequent upon it, an additional motive is furnished for placing the axles at a considerable distance apart.

The object of my invention is, among 20 other things, to make such an adjustment or arrangement of the wheels and axles, as shall cause the body of the car or carriage to pursue a more smooth, even, direct and safe course than it does as cars are ordinarily constructed, both over the curved and straight parts of the road, by the beforementioned desideratum of combining the advantages of the near and distant coupling of the axles and other means to be hereinafter described.

For this purpose, I construct two bearing 21 carriages, each with four wheels, which are to sustain the body of the passenger or other car, by placing one of them at or near each end of it, in a way to be presently described. The two wheels on either side of these carriages are to be placed very near to each other; the spaces between their flanges need be no greater than is necessary to prevent their contact with each other.

but not at high velocities, and why.

Serpentine motion with cars at high speed, on curved and straight parts;

and why.

To avoid this, a motive for remote axles.

Object of invention.

To produce a more smooth, easy, direct and safe course, on curved and straight parts, by near and distant coupling.

Construction — two bearing carriages.

Wheels "very near;"

"need be" no further than to keep flanges from contact. Spring connection—double usual strength.

Ends secured to boxes.

Long leaves down.

Two pairs of wheels united, make bearing carriage.

Bolster.

Strength of bolster.

Second bolster.

Centre pin.

Swiveling, as in common road wagon.

Both bearing carriages prepared in same way.

Body double the 23 ordinary length and capacity.

Rest on upper bolsters.

Sometimes all the wheels under the body.

Less strength of body necessary then.

Sometimes body between the two sets of wheels.

These wheels I connect together by means of a very strong spring—say double the usual strength employed for ordinary carsthe ends of which springs are bolted, or otherwise secured, to the upper sides of the 22 boxes, which rest on the journals of the axles; the longer leaves of the springs being placed downwards, and surmounted by the shorter leaves. Having thus connected two pairs of wheels together, I unite them into a four-wheel bearing carriage, by means of their axles and a bolster of the proper length, extending across between the two pairs of wheels, from the centre of one spring to that of the other, and securely fastened to the tops of them. This bolster must be of sufficient strength to bear a load upon its centre of four or five tons. this first bolster I place another of equal strength, and connect the two together by a centre pin or bolt, passing down through them, and thus allowing them to swivel or turn upon each other in the manner of the front bolster of a common road wagon. prefer making these bolsters of wrought or cast iron; wood, however, may be used. prepare each of the bearing carriages in precisely the same way.

The body of the passenger or other car I make of double the ordinary length of those which run on four wheels, and capable of

carrying double their load.

This body I place so as to rest its whole weight upon the two upper bolsters of the two before-mentioned bearing carriages or running gear. I sometimes place these bolsters so far within the ends of the body of the car as to bring all the wheels under it; and, in this case, less strength is necessary in the car-body than when the bolster is situated at its extreme ends. In some cases, however, I place the bolster so far without the body of the car, at either end, as to allow the latter to hang down between the

two sets of wheels, or bearing carriages, and to run, if desired, within a foot of the rails.

When this is done, a strong frame-work 24 projects out from either end of the car or carriage body, and rests upon the upper bolsters of the two bearing carriages. This last arrangement, by which the body of the car is hung so low down, manifestly affords a great security to the passengers, exempting them in a great degree from those accidents to which they are liable when the load is raised. Several bodies may be connected, or rest on a common frame, and be supported on the bearing carriage, in a manner similar to that of a single body.

When the bolsters of the bearing car-25 riages are placed under the extreme ends of the body, the relief from shocks and concussions, and from lateral vibrations, is greater than it is when the bolsters are placed between the middle and the ends of the body; and this relief is not materially varied by increasing or diminishing the length of the body, while the extreme ends of it continue to rest on the bolsters of the bearing cars, the load being supposed to be equally distributed over the entire length of the body.

Although I prefer the use of a single spring $26 \, {}_{ ext{ferred.}}^{ ext{Sing}}$ to a pair of wheels as above described, instead of the ordinary spring to each wheel, and consider it as more simple, cheap and convenient, than any other arrangement; the end which I have in view may, nevertheless, be obtained by constructing the bearing carriages in any of the modes usually practised, provided that the fore and hind wheels of each of them be placed very near together; because the closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of two bearing carriages coupled remotely from each other as can conveniently be done, for the support of one body, with a view to the objects and on the principles herein set 27 most important feaforth, is considered by me as a most import-

Advantages of suspending body.

Several bodies may rest on a common frame.

Bolsters at extreme ends, greater relief from shocks.

This not materially varied by increasing the length of body, while bolsters at extreme ends.

Single spring pre-

Yet end obtained by common bearing carriage, provided fore and hind wheels very near together.

Closeness of wheels

Carriages coupled remotely, in view of objects set forth,

Contiguity of fore and hind wheels, while bearing carriages any desirable distance appart.

Lateral friction avoided.

Advantages of far apart axles obtained.

Bearing on centre 28 of bolster affords relief from shocks, &c.

Two wheels, from proximity, considered as acting like a single wheel.

Bearing carriages apart, consistently with strength of body.

Advantage.

Safety of passengers.

Less liability to breakage.

ant feature of my invention; for, by the contiguity of the fore and hind wheels of each bearing carriage, while the two bearing carriages may be at any desirable distance apart, the lateral friction from the rubbing of the flanches against the rails is most effectually avoided, whilst, at the same time, all the advantages attendant upon placing the axles of a four-wheeled car far apart, are thus obtained.

The bearing of the load on the centre of the bolster, which also is the centre of each bearing carriage, likewise affords great relief from the shocks occasioned by the percussions of the wheels on protuberant parts of the rails, or other objects, and from the vibrations consequent to the use of coned wheels; as the lateral and vertical movements of the body of the car, resulting from the above causes are much diminished. The two wheels on either side of one of the bearing carriages may, from their proximity, be considered as acting like a single wheel; and as these two bearing carriages may be placed at any distance from each other, consistent with the required strength of the body of the car, it is evident that all the advantage is obtained which results from having the two axles of a four-wheeled car at a distance from each other, whilst its inconveniences are avoided.

Another advantage of this car compared with those in common use, and which is viewed by me as very important, is the increased safety afforded by it to passengers; not only from the diminished liability to breakage, or derangement in the framework, but also from the less disastrous consequences to be apprehended from the breaking of a wheel, axle, or other part of the running gear, as the car-body depends, for its support and safety, upon a greater number of wheels, and bearing points on the road.

30 I do not claim, as my invention, the run-

Disclaimer.

Claim.

Connection with a rail-road car.

ning of cars or carriages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried, more evenly upon a rail, or other road, and for objects distinct in character from those which I have had in view, as hereinbefore set forth. Nor have the wheels, when thus increased in number, been so arranged and connected with each other, either by design or accident as to accomplish this purpose.

What I claim, therefore, as my invention, 31 and for which I ask a patent, is the before-described manner of arranging and connecting the eight wheels, which constitute the two bearing carriages, with a rail-road car, so as to accomplish the end proposed by the means set forth, or by any others which are analogous and dependent upon the same principles.

ROSS WINANS.

G. Brown, Jno. H. B. Latrobe, $\}$ Witnesses.

(RECORDING ANEW OF THE PATENT.)

Patent Office. Received 7 June, 1837, and recorded anew in this Office.

H. L. ELLSWORTH,

Commissioner of Patents.

Patent Office, Dec. 28, 1854. Received, Dec. 21, 1854, and, on account of alleged errors in the record, recorded again.

C. MASON,

Commissioner of Patents.

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(RESTORATION OF THE DRAWINGS OF THE PATENT.)

References to the annexed drawings of Ross Winans' improvement in the construction of cars or carriages intended to run on rail-roads, for which letters patent were issued, dated October 1st, 1834:

Fig. 1.—Side view of an eight-wheel car.

Fig. 2.—End view of the same.

Fig. 3.—Upper and lower bolster detached from the body

and bearing carriage.

AA. represents the body of the car resting on the bearing carriages B. and C., as exhibited at DD., on pivots equidistant from the wheels of each bearing carriage.

H. represents an upper bolster of cast-iron, separate from the body of the car, with its pivot X. corresponding with the socket Y. in the lower bolster E., also shown as separate from the bearing carriage.

State of Maryland, Baltimore City, ss:—On this nineteenth day of November, in the year eighteen hundred and thirty-eight, before me, the subscriber, a justice of the peace of the said State, in and for the said city, personally appeared Ross Winans, and made solemn oath that he is the inventor of an improvement in the construction of cars or carriages intended to run on rail-roads, for which letters patent of the United States were granted to him, dated the first day of October, 1834, and that the annexed drawing is, as he verily believes, a true delineation of the invention, as described in the said letters patent.

Sworn before

JAMES BLAIR, Justice of Peace.

(Extension of the Patent.)

In the matter of the application of Ross Winans for an extension of his patent for improvements in rail-road cars and carriages, dated October 1st, 1834.

The third Monday in September, 1848, (25th,) having been appointed for hearing the application of the said Ross

Winans, the undersigned, agreeably to published notice, and after examining the evidence adduced by the petitioner, decided that said patent ought to be extended.

H. H. SYLVESTER,

Acting Comm'r of Patents.

Sept. 25, 1848. The petition and testimony of the said Ross Winans having been fully examined, it is ordered that his patent be extended.

H. H. SYLVESTER,

Act'g Com'r.

Whereas, upon the petition of Ross Winans, of Baltimore, Md., for an extension of the within patent, granted to the said Ross Winans on the first day of October, 1834, the undersigned, Acting Commissioner of Patents, under the 18th section of the Act of Congress, approved the 4th day of July, 1836, entitled "An act to promote the progress of the useful arts, to repeal all acts heretofore made for that purpose," and the act approved 27th May, 1848, entitled "An act to provide additional examiners in the Patent Office, and for other purposes," did, on the 25th day of September, 1848, certify that said patent ought to be extended:

Now, therefore, I, Henry H. Sylvester, Acting Commissioner of Patents, by virtue of the power vested in me by said acts of Congress, do renew and extend said Patent, and certify that the same is hereby extended for the term of seven years, from and after the expiration of the first term, viz., the first day of October, 1848, which certificate, on the petition of the applicant, together with this certificate of the Acting Commissioner of Patents, having been duly entered of record in the Patent Office, the said patent now has the same effect in law as though the same had been originally granted for the term of twenty-one years.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed, this twenty-fifth day of September, in the year of our Lord one thousand eight hundred and forty-eight, and of the Independence of the United States

the seventy-third.

[L. S.]

HENRY H. SYLVESTER,

Acting Comm'r Patents.

In June, 1850, an action at law, brought by Ross Winans against The Schenectady and Troy Rail-Road Company, in the Circuit Court of the United States for the Northern District of New-York, for an infringement of the foregoing Letters Patent, was tried before his Honor Judge Conkling and a jury, at Canandaigua. The jury, under the following charge from the Court, rendered a verdict for the plaintiff:

JUDGE CONKLING'S CHARGE.

This trial, gentlemen, has been so deliberately conducted, and the whole merits of the case have been so fully investigated, that I shall endeavor not to detain you very long in summing it up. This suit is brought to recover damages for the alleged violation of the right claimed by the plaintiff in virtue of Letters Patent granted to him on the first day of October, 1834, and subsequently extended. The plaintiff's right to maintain his action depends on the answers to be given to the two general questions—first, whether he has a good patent; and, if so, secondly, whether it has been infringed by the defendants. To enable you to decide these questions, it is indispensably necessary that you should have a clear conception of the thing of which the plaintiff claims to be the inventor; and this is to be ascertained from the description which he has himself given of it. The law requires every applicant for a patent, to accompany his application with a full, clear and exact description of his supposed invention; and it is to this description, thus furnished by the plaintiff, that resort must be had to ascertain the nature and extent of his invention. This question must of course arise in every case of this nature, and it is often one of no little difficulty, especially in a case like the present, where the invention consists in an alleged improvement in a thing already in use; because the party is obliged to distinguish between what is old and what he claims as his invention, and this is often very imperfectly done. But the present case does not appear to me to involve any serious difficulty in this respect. The specification is drawn with great precision and perspicuity. Indeed, I do not remember ever to have seen a specification expressed in clearer or more appropriate terms. It is very easy, therefore, at least to understand what the patentee designed to say. He describes the carriages then already in use, and the practical difficulties resulting from the form and manner of their construction. He then proceeds to state in what respects and in what

manner he has altered them for the purpose of obviating these difficulties, and it is the means resorted to by him for this purpose, that he claims as his invention and improvement. These carriages had four wheels arranged in pairs, each pair having a fixed axle; and he shows the disadvantages attending the use of such carriages, especially on roads having curves of so short a radius as many of them in this country have. "The object of my invention," he says, "is, among other things, to make such an adjustment or arrangement of the wheels and axles as shall cause the body of the car or carriage to pursue a more smooth, even, direct and safe course than it does as cars are ordinarily constructed, both over the curved and straight parts of the road, by the beforementioned desideratum of combining the advantages of the near and distant coupling of the axles, and other means to be hereinafter described." This is the object of the plaintiff's invention, as stated by him. He then goes on to describe the means he has invented to effect the object he has specified; and here, again, I will read to you his own language: "For this purpose," says he, "I construct two bearing carriages, each with four wheels, which are to sustain the body of the passenger or other car, by placing one of them at or near each end of it, in a way to be presently described. The two wheels on either side of these carriages are to be placed very near to each other; the spaces between their flanges need be no greater than is necessary to prevent their contact with each other. These wheels I connect together by means of a very strong spring-say double the usual strength employed for ordinary cars—the ends of which springs are bolted, or otherwise secured to the upper sides of the boxes which rest on the journals of the axles, the longer leaves of the springs being placed downwards, and surmounted by the shorter leaves. Having thus connected two pairs of wheels together, I unite them into a four wheel bearing carriage, by means of their axles and a bolster of the proper length, extending across between the two pairs of wheels, from the centre of one spring to that of the other, and securely fastened to the tops of them. This bolster must be of sufficient strength to bear a load upon its centre of four or five tons. Upon this first bolster I place another of equal strength, and connect the two together by a centre pin or bolt passing down through them, and thus allowing them to swivel or turn upon each other, in the manner of a front bolster of a common road wagon. I prefer making these bolsters of wrought or cast iron; wood, however, may be used. I prepare each of the bearing carriages in precisely the same way. The body of the passenger or other car, I make of double the ordinary length of those which run on four wheels, and capable of carrying double their load. This body I place so as to rest its whole weight upon the two upper bolsters of the two before-mentioned bearing carriages or running gear. I sometimes place these bolsters so far within the ends of the body of the car as to bring all the wheels under it; and in this case, less strength is necessary in the car body, than when the bolster is situated at its extreme ends. In some cases, however, I place the bolster so far without the body of the car, at either end, as to allow the latter to hang down between the two sets of wheels or bearing carriages, and to run, if desired, within a foot of the rails."

He then goes on to speak of some particular features of his invention, and finally he states explicitly, in a summary at the end of the specification, what he claims, and what he does not claim, as follows:—"I do not claim, as my invention, the running of cars or carriages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried, more evenly upon a rail or other road, and for objects distinct in character from those which I have had in view, as hereinbefore set forth. Nor have the wheels, when thus increased in number, been so arranged and connected with each other, either by design or accident, as to accomplish this purpose. What I claim, therefore, as my invention, and for which I ask a Patent, is the before described manner of arranging and connecting the eight wheels, which constitute the two bearing carriages, with a rail-road car, so as to accomplish the end proposed by the means set forth, or by any others which are analogous and dependent upon the same principles."

This, then, is the improvement of which the plaintiff claims to be the inventor. I do not know that I can give you a more clear idea of it than has been given you by the reading of it. You have heard read, in the course of the trial, the instruction given, on a trial at Baltimore, by the Chief Justice of the United States, as to the claim of the patent; and that instruction, which seems to me to be entirely proper, and which I desire to be considered as adopting, is couched almost wholly in the very language of the

specification.* It is, then, the improvement which he thus describes, of which the patentee claims to be the inventor.

The next question, gentlemen, is whether the plaintiff has given a sufficient description of his invention. A patentee is bound to give all the information necessary to the successful use of the invention. It is denied by the defendants that the plaintiff has complied with this condition, and they insist that the patent is therefore void. It is, among other things, insisted by the defendants' counsel, that the plaintiff ought to have specified the distance at which the trucks are to be placed from each other, and that he has not done so. This objection relates to an important part of his invention, and the successful use of it depends upon the arrangement of the wheels and trucks. The two pairs of wheels in each truck must be near together, and the trucks remote from each other. The plaintiff was, therefore, bound to give instructions as to the location of the wheels and trucks.

It is also said that he has given no directions as to the length of the body of the car; but he says that the body admits of indefinite extension, and in that he considers the value of his invention to consist. Its length, therefore, is left to be determined by choice and circumstances. He could not specify the particular number of feet between the trucks, and it appears to me that he has specified with sufficient exactness the part of the carriage where the trucks are to be placed. He says they are to be placed at or near the end of the car; sometimes, he says, he places them just under the end, and at others just without the end. They

^{*} The instruction referred to was given by Chief Justice Tanex to the jury, on the trial of the case of Ross Winans vs. The Newcastle and Frenchtown Rail-Road Company, at Baltimore, in 1839, and was as follows:

[&]quot;According to the true construction of the plaintiff's patent, he claims to be the first inventor of a car with eight wheels, arranged and connected in the manner, and acting upon the principles stated in his specification, the object of which is to make such an adjustment or arrangement of the wheels and axles, as shall cause the body of the car to pursue a more smooth, even, direct and safe course, both over the curved and straight parts of a rail-road. He does not claim to be the inventor of the eight wheel car; nor does he claim to be the discoverer of the effect produced by the near and the more remote position of the wheels of an ordinary four wheeled rail-road car. Neither does he claim to be the inventor of a car-body, either for burden or for passengers, of a new or peculiar construction; nor of any new manner of fixing the car to the steamengine, or other power by which it is to be drawn along the road. But he claims as his invention, the manner of arranging and connecting the eight wheels, as specified in his patent, for the end above mentioned; and, also, the connection of a rail-road carriage-body with them, adapted either to the transportation of merchandise or of passengers."

must, therefore, be placed near the ends of the car, or, in other words, as far apart as the length of the carriage will conveniently admit. It is very true that a patentee is bound to give full information to the public as to the manner of carrying out his invention, but he is not bound to inform the public of more than he knows. It is said to be at present the practice to place the trucks a little further under the carriage, but it is proper to consider the circumstances under which the plaintiff made his invention, if such it be. that time there was only one short rail-road, the Mohawk and Hudson, in full operation, with portions of some others. It was then that he commenced the invention of a better car, and, in applying for a patent, he could only be required to inform the public of all that he had then ascertained; and, though the carriage may have been improved by others, this constitutes no valid objection to his patent, if the thing he has invented was new and useful, and he has in good faith disclosed it to the public. A patent is none the less valid because a better thing has been subsequently invented. So far as I can discern, there is not the slightest reason to suppose that the patentee has designedly kept back any thing known to himself which the public had an interest in

It is said, moreover, that the plaintiff has not indicated in his specification the point or part of the car at which the motive power is to be applied, and that at the same time it is here insisted by his counsel, that in order to the beneficial working of his invention, it is highly important that this power should be applied directly to the body of the car, instead of to the truck, to which it appears to have been uniformly attached before his invention. If it had been shown by proof that the patentee had discovered that this change was beneficial, and had concealed the fact, it may be conceded that this would have been sufficient to invalidate his patent. It is true that he has not stated in his written specification where the motive power is to be attached. But this is one of those cases in which the inventor is not only permitted, but required by law to accompany his application with a drawing explanatory of his invention. This drawing is to be accompanied with written references. There may be cases in which it would be better, perhaps necessary, to incorporate these references in the written specification; but the law does not require this to be done, provided the description and drawing can be rendered sufficiently intelligible without. The plaintiff has furnished a drawing, with

written references on the same paper, and the witnesses tell us, as indeed we see to be the fact, that the drawing clearly indicates the point of traction. The drawing, therefore, is none the less efficacious for not being referred to in the writing. Being deposited along with the written specification in the patent office, it is equally accessible to the public. It is a part of the specification, and if it is intelligible, that is sufficient to satisfy the requirements of the statute. If, indeed, the infringement complained of had consisted in the use by the defendants of this new mode of traction, the action, I think, could not be maintained; for I am of opinion that, according to the true construction of the specification, the plaintiff's claim does not extend to this mode of coupling, it not being mentioned at all in the written specification; and, his claim being "the before described manner of arranging and connecting the eight wheels," &c., he has limited himself to what he had before described. do I understand him now to claim any thing beyond this. But what the plaintiff complains of is, the use by defendants of his entire railway carriage. The objection to which I am now directing the attention of the jury, is that he has not sufficiently described his invention; and, in answer to the objection, he is entitled, as I have already said, to point to this drawing.

Again, it is said that the patentee has omitted to describe side bearings; that the provision made by him, as represented by his drawing, is insufficient for this purpose; that a carriage constructed according to his drawing would be unsafe and therefore useless; and that his patent is therefore void. This question depends upon the drawing. There seemed at first to be some diversity of opinion among the witnesses as to whether the bolsters, shown in the drawing, came in contact with each other, except at the centre, but it appeared to be finally agreed, that there is a bearing shown on each side of the centre pin, though the witnesses are not perfectly agreed as to the extent of the bearing. Mr. Pond applied his rule to the drawing, and, by the aid of the scale from which the drawing was made, stated the bearing to be about sixteen inches on each side, while some other witnesses made it less. It is testified, however, that a large number of cars were made for the Baltimore and Ohio Railway according to this specification, and with this extent of bearing, that they were successful, and that they have been in use ever since. Mr. Glenn says that they are made in that way still. But, gentlemen, I have already taken occasion to observe

that a patentee is only bound to disclose all that he has ascertained. At the time of this invention, rail-road cars were not run at the speed at which they are now moved, and if it has been discovered since that the plaintiff's bearings are insufficient for the present rates of speed, that can be no objection to the patent. The patentee probably had no idea of the present rates of speed; and what he desired to invent was something applicable to the rates of speed then known. Mr. Williams, a very intelligent witness for the defendants, says that these bearings are not sufficient for our present rates of speed, but that, in his opinion, they are sufficient for the rate of fifteen or even twenty miles an hour; and it is no objection to this patent that the bearings shown are not sufficient for the rate of forty miles an hour.

The next question, gentlemen, for your consideration, is whether the plaintiff is indeed the inventor of that which he claims. This is denied by the defendants. The first evidence upon this point on the part of the plaintiff, is the patentitself. The patent is prima facie evidence of the novelty of the thing claimed, and it is sufficient evidence until the contrary is shown. And this should be so; for, the patentee, when he takes out a patent, must describe his invention, and make oath to it; and moreover, no patent can properly be issued unless the Commissioner of Patents believes the applicant to be the true inventor. It is, therefore, right that the mere production of the patent should be sufficient evidence in and of itself, of the novelty of the asserted invention, until it is disproved. It is, however, the right of the defendant to contest the novelty of the invention. If he can show, by a satisfactory prependerance of evidence, that the patentee was not the inventor, then the patent must fail. I understood it to be suggested by one of the counsel for the defendants that the patentee was bound to prove, beyond a reasonable doubt, that he was the inventor. This is certainly a great mistake. On the contrary, it is the defendants who are bound to prove to your satisfaction that the plaintiff was not the inventor. The defendants hold the affirmative, and must maintain their allegation by a preponderance of evi-

Whenever a plaintiff receives notice of a defence on the ground of a want of novelty in the invention, he may, upon the trial, after producing his patent, either rest his evidence on the point of invention, or he may anticipate the defence and endeavor, by additional evidence, to fortify his case in the first instance. The plaintiff here, has adopted this latter course, and has given the history of his alleged invention. On his return from England, in June, 1830, he entered into

the service of the Baltimore and Ohio Rail-Road Company, having been engaged by the Chief Engineer, with the approbation of the directors, as his assistant. He entered into a contract with the Company, to give them the benefit of his talents, in preparing for the successful operation of their They were to pay him a specified salary, and allow him the use of their workshops and tools, and of their road, for the purpose of making experiments, and it was agreed that they should be entitled to the use of what he invented; but there was nothing in that agreement which could deprive him of the right to a patent for his invention. In pursuance of this agreement, as the plaintiff alleges, the passenger car Columbus was constructed. He insists that he was the inventor of it, and that it was built under his directions. establish this, he has introduced the depositions of Mr. Thomas, the President of this company, Mr. Brown, the Treasurer, Mr. Knight, the Chief Engineer, Mr. Elgar, an Assistant Engineer, and Mr. Latrobe, the Counsel. These gentlemen were intimately connected with the road and strongly interested in knowing every thing that went on. They all concur in saying that Mr. Winans devised the Columbus.

We then have the drawing which has been produced by Mr. Cromwell. He and Mr. Glenn testify that they assisted in making this very car, and that the drawing was made by Mr. Winans, and furnished by him for the purpose of having a car built in conformity to it. They also testify that the draft of the running gear was copied from this drawing, upon a board, to work from, and Mr. Glenn states that this was done by Mr. Gatch, in the shop, upon a bench within two feet of where he, Glenn, was working. We then have a description of the progress of the work, and the concurrent testimony of all the persons connected with it, except Gatch, ascribes the invention to Mr. Winans. But Mr. Gatch, in his deposition, says that he believes himself to have been the contriver of this carriage. He was the foreman of the shop where it was made, and says that according to his recollection the drawing furnished by Mr. Winans represented only the body of the carriage, and that the drawing of the trucks on the board, was his own original work. This diversity of recollection is somewhat remarkable, and it may not be easy to account for it. The explanation suggested by one of the counsel for the plaintiff is, that Gatch having been engaged in the construction of the car, and having thus at once become familiar with all its parts, which after all are few and simple, may have erroneously imagined that it was his own invention. But it will be for you, gentlemen, to say how the fact is, and whether the recollection of Mr. Gatch ought to prevail against that of all the witnesses officially connected with the road, whom I have named. You will bear in mind also that it was the especial duty of Mr. Winans to direct his attention to improvements of this nature, and that this was no part of the duty of Mr. Gatch, whose business it was to see that the mechanical work committed to his charge, as

foreman, was done, and to labor upon it himself.

It appears from the drawing of the Columbus, and from the evidence, that the trucks were placed at a considerable distance from the ends of the body of the carriage, and that the wheels composing the trucks were placed much further apart than in the car described in the patent; that the power was attached to the truck instead of the body; and that the axles ran in friction boxes. The Columbus was put into use late in June or early in July, 1831, when a trial trip was made with it to Ellicott's Mills. The witnesses say that it was used with horse power, that it did not work well, and was not satisfactory, and that it sometimes ran off the Other eight-wheel cars were subsequently built, but none until 1833. Little seems to have been at that time done upon the road, and but few cars to have been needed. The witnesses say that the Columbus was used only occasionally; that Mr. Winans was not satisfied with it; and that he subsequently caused the Winchester, the Dromedary and the Comet to be constructed. The precise date of the construction of these does not appear; but the Winchester seems to have been made in 1833, and the Dromedary and Comet early in 1834. The witnesses give the same account of these as of the Columbus—that they did not work well, were unsatisfactory, and there was a desire to get something better.

In October, 1834, the carriage described in the patent is stated by the witnesses to have been devised by Mr. Winans, and to have been formally adopted by the company; and directions were then or soon after given for making a considerable number. They were made during the fall and succeeding winter, and in the spring of 1835 were put on the Washington Branch. All the witnesses represent Winans as engaged in devising a suitable car, and, with the exception of Mr. Gatch, represent him as the original and only inventor. This is the evidence on the point of novelty, given by the plaintiff

in addition to his patent.

On the part of the defendants, however, it is insisted that carriages substantially like that in question were previously

described in certain public works; and, to establish this, they produce two English books—Wood on Rail-Roads, published in 1825, and a volume of the Repertory of Arts, published in 1814. The latter reference is to the steam carriage of the Messrs. Chapman, patented in 1812, in England. They insist that each of these contains a description and drawing of what is substantially like the rail-road car which the plaintiff has patented. I shall not enter into a detailed explanation of the drawings and descriptions contained in these books, nor recapitulate the views and arguments concerning them, which have been so elaborately presented to your consideration by the counsel on the one side and the other, but shall content myself with calling your attention, presently, to some

principles of law applicable to the subject.

Before doing so, however, it is proper also to remind you, that in addition to what appears in these English works, it is insisted that the whole of the plaintiff's invention is to be found in a carriage invented by Ephraim Morris, in 1829, for the purpose of conveying boats from one level to another on the Morris Canal—thereby dispensing with the use of locks for that purpose. A model of this carriage has been produced, and the patentee himself has been brought as a witness. He is of opinion, it seems, that his car is the same in principle as that of the plaintiff. I have little to observe concerning it. It seems to me, I confess, to be rather a far fetched thing, neither designed nor adapted for any such purpose as the plaintiff's car. It was made to surmount a series of vertical angles, formed by successive inclined planes, and it is therefore provided with several four-wheeled trucks, the wheels of which, on each side, rise or fall alternately, so as to adapt them to the support of the carriage on the varying planes which it had to encounter in its progress. But it is very clear that there is nothing in this arrangement to fit it for use on a curved rail-road. Mr. Morris had, in its invention, no view to the objects which governed the patentee in this case, and consequently his carriage looks like a different thing from the plaintiff's. But, gentlemen, the question of its substantial identity is a question of fact, and it is for you to decide it.

It is shown, also, that before the construction of the Columbus, a timber car on eight wheels was used on the Baltimore and Ohio Rail-Road. Two common earth or stone cars, each with four wheels, at a considerable distance apart, were attached together by a reach, for the purpose of transporting long timber. To avoid the difficulty of turning the curves,

a bolster was put upon each car, and a centre pin through the middle of each bolster, and on these bolsters the timber was placed. The power was applied to the truck, there being, indeed, no other place to apply it; and it has been testified and explained by the witnesses, that although these movable bolsters would facilitate the passage of this vehicle around curves, the loading would nevertheless crowd and slide upon them. It is denied also, by the plaintiff's counsel, that this timber carriage can properly be regarded as an organized vehicle, being made up for temporary use, of parts designed to be and generally separately used, and for other purposes, and that it is idle to pretend that it is like the passenger car described in the patent. Of this, you are to judge.

It is further alleged by the defendants, that the Experiment and John Bull locomotives, each with a single truck under the forward end, and the timber car used by Mr. Williams on the Mohawk and Hudson Rail-Road, were substantially the same thing as the plaintiff's car. But these things were all introduced in 1832, and although before the date of the patent, were subsequent to the construction of the Columbus. The plaintiff shows that whatever these things contained which is embraced in his patent, was contained also in the Columbus. He insists, therefore, that he is in fact the first inventor of them. If this is so, then they do not stand in his way.

A great deal has been said in the course of the trial, about inventive power, and the experts have been asked whether the differences between the plaintiff's car and those things which preceded it, required the exercise of the inventive faculty. On this point, witnesses have been examined on both sides. The defendants' witnesses say that these prior inventions were substantially like what the plaintiff has patented, and that it required no genius, after seeing those things, to construct the plaintiff's car. The experts upon the other side express a directly opposite opinion. It is probable that among these gentlemen, there is really no great diversity of opinion, but that they attach different meanings to the words invention and principle, &c., and that both speak truly according to their conceptions. It is right, in cases like this, to call experts to give their opinion. Other witnesses speak as to facts, but here the opinions of persons skilled in the subject matter of the controversy are asked; and I cherish an habitual respect for the opinions of learned men, thoroughly skilled in a subject on which they are called to speak. But

unfortunately, they give opposite answers to the same question; and where, as is very apt to be the case in patent causes, about the same number of experts is called on each side, the case may be left where it would have stood, if they had not been called at all, and the jury are in the end obliged to rely on their own judgments in deciding upon the question on which the experts have given their opinions. Not that evidence of this nature is to be rejected, because it is conflicting; but the jury are to determine for themselves upon the weight which ought to be given to it, upon the one side and the other. And for this purpose it is the duty of the jury in these, as in all other cases, to observe the demeanor of the witnesses under oath, and to observe whether they testify deliberately and with proper reflection, and whether they appear to understand the subject well, and to give such weight to the evidence of each as it shall appear to deserve.

But it is important, gentlemen, that you should understand the precise nature of this objection, of the want of novelty in the invention. It is not pretended that any other person previously invented a rail-road passenger carriage like the plaintiff's. All that is insisted is, that the thing which was before in use for other purposes were so nearly like this, that there is no merit in the plaintiff's invention which entitles him to a patent. The objection is, that he has, at least, but applied an old thing to a new use. The mere application of an old thing to another use, is not the subject of a patent, if it be only to what the law denominates an "analogous" use. Thus, it has been said, that after the invention of a spoon for the purpose of eating soup, a patent cannot be obtained for the discovery that it can be conveniently used also in eating peas. Nor could there be a valid patent for the use of a coffee mill in grinding pepper. In such cases, no ingenuity at all is required to discern the applicability of the old implement to the new use. It is a mere dictate of common sense.

But it is a mistake to suppose that the right to a patent depends on the amount of ingenuity, thought, skill or experiment which has led to the invention. Invention means to find out; and it is no matter how the thing is found out. A mere lucky thought may give a man a right to a patent, provided it be of something new and useful. Very often, a man, in trying to find out one thing, finds out another; and yet, though his discovery be not the effect of design, but of mere chance, he is not on this account the less entitled to a patent for it. It is a mistake, therefore, to suppose that, to render an invention patentable, it must appear to have been

the fruit of extraordinary genius or talent, or laborious study. It is no matter how simple the thing is. Some of the most important improvements in the history of human progress have been exceedingly simple, or at least now appear so. And there is always danger of doing injustice in estimating the merit of inventions; because, when we have become familiar with an invention, it may appear to have been very easy, when in truth it was far otherwise. One part of the evidence in the present case will serve to illustrate this. I allude to the deposition of Mr. Jervis, one of the defendants' witnesses. The effect of it is, to show that he devoted a great deal of time and thought before he succeeded in applying the four wheel truck usefully to the locomotive engine. Mr. Jervis is conceded to be a man of high endowments, and of great eminence as a Civil Engineer. I will read to you his account of the introduction and improvement of the engine on the Mohawk and Hudson Rail-Road. have paid," he says, "a great deal of attention, since I have been connected with rail-roads, to the construction of locomotives and cars. I have a good deal of knowledge of the principle upon which the running part of a locomotive and cars which are now used, and which have been in use since I have been engaged in my profession, have been constructed and used. My attention has been particularly directed to the subject of the arrangement of the wheels of locomotives and cars, to facilitate the running of locomotives and cars on curves. My attention was very early directed to that subject. It was a subject on which I had often thought a great deal, but made no experiments until 1831. In 1831, and early in 1832, I was very much engaged in devising some means by which four wheels could be substituted for two, as the leading wheels of the locomotive, and finally prepared a plan by which the forward end of a locomotive was supported by a sort of independent carriage, consisting of four wheels. These wheels were placed near to each other, and working under the main frame of the engine, which rested mainly on the outside timbers, on friction rollers, supported in its lateral position on the frame of the independent carriage by a centre pin; and this independent carriage being a substitute for the two wheels formerly used." Mr. Jervis, you will see, here represents himself to have been, as he doubtless was, an original inventor or contriver of the great improvement which he thus describes. But this was the year after Mr. Winans made a like application of four-wheeled trucks to the Columbus, and about the time of a similar improvement made by him on the locomotive Herald, as testified to by Mr. Alexander. Now, you have seen that both the carriages described in the English books, to which I have referred, are locomotives; designed, however, for purposes very different from the transportation of passengers over long rail-roads. One of them (Chapman's) is exhibited in the drawing with but six wheels, but the inventor says that where the load is so heavy that it will injure the road, two pairs of wheels may be substituted for the single pair of wheels with fixed axles, and this suggestion is relied on by the counsel for the defendants to disprove the novelty of the plaintiff's invention. Now, these books were equally accessible to Mr. Jervis and to Mr. Winans, and, considering their characters, and the nature of the pursuits of these gentlemen, it seems not unreasonable to conclude that they were both acquainted with them. But we see nevertheless, from the evidence of Mr. Jervis, that it was only after long and laborious study, that he succeeded in making an improvement in the locomotive corresponding with that which it is insisted Mr. Winans made in the passenger car. The locomotive in use on the English railway had one pair of running wheels on a fixed axle, as the passenger carriages both in England and those in this country, (then few in number,) had a single pair of wheels on a fixed axle at each end; and Mr. Jervis, after the earnest and persevering devotion of his faculties to the subject, and, as far as we are apprised, with all the lights possessed by Mr. Winans, at length succeeded in devising and adapting a four-wheel truck for the support of the forward end of a locomotive, as Mr. Winans did in devising a like improvement for the support of each end of a passenger Now, with these circumstances before us, I must say that it seems to me to be requiring a great deal at your hands to ask you to say that there is no merit in what the plaintiff claims as his invention. But, gentlemen, it is for you to determine, whether you find in it any thing substantially different from these other things previously in use. No one, I believe, pretends that any one of them could be beneficially used for the conveyance of passengers on railways, without extensive modifications; but very slight changes of mechanism may sometimes be the subject of a patent. A case which has given rise to litigation in our own courts, may serve to exemplify this. The patent was for an improvement in the casting of rollers or cylinders. It was known before, that if a revolving motion could be given to the molten iron when poured into the mould, this motion, by force of the centrifu-

gal tendency thus communicated to the fluid, would produce the useful effect of throwing the pure iron to the outside, leaving the dross within; and it had long been desired to discover a means of producing this revolving motion in casting rollers or cylinders. A workman employed in an iron foundry at Pittsburgh, discovered that if the melted iron, instead of being poured into the mould in a vertical or horizontal direction, were poured in obliquely, the revolving motion would be obtained. For this purpose it was only necessary to change the direction of the tube already in use, and this is what the man did, and he obtained a patent for his invention; having thereby produced a new and useful Another illustration by an English judge is this: If a surgeon goes to a mercer's shop and sees him cutting velvet or silk with a pair of scissors, and he says, I see how well your scissors cut, and I can, by putting a knob at the end, use them instead of a lancet, to cut skin, he might get a patent for that. The general principle is this, that wherever a man finds out by accident or design, by much or little study, a new and substantially useful thing, and shows how it may be usefully applied, he is entitled to a patent, and the question here for you to decide, gentlemen, is, whether the plaintiff has not done this. It is certainly no insignificant fact, that carriages like that described by the plaintiff in his patent, have superseded the kind of vehicle previously used, and are now in universal use in this country. By means of them we have been enabled to construct our roads far more cheaply than we could otherwise do, by admitting curves of comparatively short radii, and yet to run them at high speed, with long, convenient, safe and strong carriages. But, gentlemen, the question of fact as to the novelty of the invention, is one which you are to decide, and in all that I have said I must not be understood as desiring in any manner to dictate to you the verdict you are to render on this point.

But it is further argued on the part of the defendants, that admitting the invention of the plaintiff and its novelty, he has abandoned it, by suffering it without objection to go into public use, in the Columbus, the timber cars and the locomotives, and that he cannot now reclaim it. If what is asserted as a fact be true, this result will follow as a legal consequence. Thus, for example, assuming that Mr. Jervis was the first inventor of the improvement described by him, in the locomotive, not having at the time taken a patent for it, and having permitted it to become publicly known and

used without objection, he has no longer any right to claim it as his own exclusive property. The law in this respect is just, for otherwise the public would be deceived, and the inventor, after first making all the profit from his invention that he could without a patent, might still secure to himself its exclusive use for fourteen years longer. Does this case come within the rule, and within the reason of it, and has there been an abandonment by Mr. Winans of his invention?

The answer given to this objection by the plaintiff is, that he did not in fact perfect his invention until the fall of 1834. It is true that the Columbus was built and put into use in 1831; but it is described by the witnesses connected with the Baltimore and Ohio Road, as imperfect and unsatisfactory; and it is insisted that the whole intermediate period, until the fall of 1834, was employed by the plaintiff in making the necessary experiments to perfect it. It was during this period that the other three cars were built; and, considering the importance of the subject, and the natural anxiety evinced by the gentlemen charged with the interests of the road, as represented by themselves in their depositions, this explanation of the delay seems reasonable. It was not until the fall of 1834 that a carriage of definite form and arrangement was agreed upon, and the application of the plaintiff for a patent seems to have been simultaneous with this determination. Now the law allows to an inventor a reasonable time to make experiments, for the purpose of maturing his invention and ascertaining its practical utility. The object of the patent law is to benefit the public by stimulating ingenious men to the useful exercise of their inventive faculties; and this object is best attained by allowing them sufficient time to achieve the highest degree of success of which they are capable. The law, with certain limitations, accordingly permits this. If an inventor was required to take out a patent, if at all, upon the first occurrence of a thought of something apparently promising utility, not only would the policy of the law be obstructed, but inventors would be harassed and subjected to unnecessary expense. The law, however, requires the inventor to act in this respect with sincerity, good faith and prudence. In applying these principles to cases, as they arise, reference must necessarily be had to the particular circumstances by which they are characterized. If the invention be of a nature to admit of the necessary experiments by the inventor in his own house, a more stringent rule may right-

fully be applied to the case, than to one in which such experiments can only be made in public. Such is the nature of the plaintiff's alleged invention; and he is entitled to a liberal interpretation of the law of abandonment. It was only on the Baltimore and Ohio Rail-Road, and by the assistance of many persons, that the reality and utility of his supposed invention could be tested; and it was stipulated between him and the company, that he should have the use of the road for this purpose. But it is testified that his cars did not work well, and that, from time to time, he changed their construction, and that finally, in the fall of 1834, he completed his invention and obtained his patent. In short, gentlemen, you are to decide whether, under all the circumstances of the case, the plaintiff is to be considered to have dedicated his invention to the public, or to have lost his right by neglect. In other words, you are to decide whether he has not fully and fairly acted up to the spirit of the law. If so, his patent is not invalidated by delaying his application for it.

Lastly, it is denied by the defendants that they have infringed the plaintiff's rights, admitting the validity of his patent. Several witnesses have testified, in general terms, that the carriages in use on the defendants' road, as well as on the other rail-roads in this State, are substantially like that described in the plaintiff's patent; and Mr. Pond testifies that he saw cars in use upon the defendants' road, having certain iron work upon them made by him for the defendants, while, on the other hand, some of the witnesses for the defendants have pointed out certain differences between their carriages and that of which the plaintiff claims to be the inventor. But, gentlemen, this question of infringement is one upon which you are to form and express your own judgment. It may not be amiss to observe that it is no reproach to the defendants, in particular, that they infringe the plaintiff's patent, if they do so, and the plaintiff is not seeking exemplary damages from them. It is stated to be his desire simply to settle his rights, and it is accordingly agreed that if you find for the plaintiff, the damages shall be assessed at one hundred dollars.

After concluding his charge, his Honor, Judge Conkling, in answer to several prayers for instructions, offered by the defendants' counsel, further instructed the jury in substance as follows:

That it was undoubtedly true that a patent could not be

taken merely for a purpose, end or object, but that he doubted the pertinency of any instruction on that point in this case, because the patent here was not for a purpose, but

for the means of effecting a purpose.

That the specification was sufficient, if the patentee had described a carriage susceptible of an attachment of the power to the body, and if the drawing showed such mode of attachment, and that the plaintiff suffered no disadvantage from not stating it in his written specification, and although the drawing was not to be taken into consideration for the purpose of measuring the extent of the claim, yet it might be considered in ascertaining whether what he claimed was new.

That the patent was valid, if the plaintiff's car was sub-

stantially on the whole a new and useful thing.

That if a thing, substantially like the plaintiff's car, had been described, prior to his invention, in some public work that had been produced, then the patent was not good; but that it was not enough that the description should merely suggest the idea of the invention.

That it was a question of fact for the jury, whether the specification was sufficiently exact and intelligible, in refer-

ence to the position of the trucks.

That, in order to find for the plaintiff, the jury must be convinced that what the plaintiff had patented is useful; but that any degree of utility was sufficient to support a patent—the word useful in the patent law being used in opposition to frivolous or noxious; and that, with regard to the question of side-bearings, although the jury should think it better to have longer bearings than the plaintiff contemplated, that could not take away the utility of his invention, as it was not necessary that the thing patented should be the best possible thing of the kind that could be made.

That if the jury believed that the intermediate time between putting the Columbus into use and the taking out of his patent was devoted, by the plaintiff, in good faith, to the perfecting of his invention, he could not be considered as having abandoned it; but that if the invention was perfected in the Columbus, there could be no need of further experi-

ment.

That, in order to warrant the jury in finding an infringement by the defendants, they must be shown to have used either the same thing, or substantially the same thing as the plaintiff's invention.

The jury rendered a verdict in favor of the plaintiff, for the stipulated damages.

A motion for a new trial in the foregoing case of Ross Winans vs. The Schenectady and Troy Rail-Road Company, was made by the defendants, and was argued before Mr. Justice Nelson and Judge Conkling, in July, 1851. In September, 1851, the motion for a new trial was denied. Mr. Justice Nelson delivered the following written opinion:

Nelson, J.—I. I have examined the various grounds presented by the counsel for the defendants on the motion for a new trial, and after the fullest consideration, am of opinion the motion must be denied.

Most of the exceptions taken at the trial, and relied on in the argument here, are founded upon what we regard as an entire misapprehension of the thing claimed to have been discovered by the plaintiff, and for which the patent has been issued. This will be seen on a reference to the instructions prayed for by the defendants, upon which most of the questions in the case arise. They assume that if any material part of the arrangement and combination in the construction of the cars or carriages described in the patent was before known, or in public use, it is invalid; and hence various parts were pointed out by the counsel at the trial, and the court requested to charge, that if either of them was not new, the jury should find a verdict for the defendants.

Now, the answer to all this class of exceptions is, that the patentee sets up no claim to the discovery of the separate parts of the arrangement which enter into the construction of his cars. These may be old and well known, when taken separately and detached, for aught that concerns his invention. His claim is for the car itself, constructed and arranged as described in his patent. This, I think, is the clear meaning of the specification and of the claim as pointed out in it. Proving, therefore, that parts of the arrangement and construction were before known, amounted to nothing. The question was, whether or not cars or carriages for running on rail-roads, as a whole, substantially like the one described in the patent, had been before known or in public use, not whether certain parts were or were not substantially similar.

The argument presupposes that the claim is for the discovery of a new combination and arrangement of certain instruments and materials, by means of which a car is constructed of a given utility; and that if any one or more of the supposed combinations turns out to be old, the patent is

invalid. This is the principle upon which much of the defence has been placed. But no such claim is found in the patent. No particular combination or arrangement is pointed out as new, or claimed as such. The novelty of the discovery is placed upon no such ground. On the contrary, the result of the entire arrangement and adjustment of the several parts described, namely, the rail-road car, complete and fit for use, is the thing pointed out and claimed as new. This is the view taken by the Chief Justice of the patent, in the case of the present plaintiff against the Newcastle and French Town Turnpike and Rail-Road Company, tried before him in the Maryland District, and which was adopted by the judge in the trial of this case.

II. It was further insisted, on the part of the defendants, that if the relative position of the two bearing carriages to each other, constituted a material part of the arrangement in the construction of the cars, the patent was void, unless the jury should find that the specification described with sufficient precision the location of these bearing carriages under the body of the car, so as to enable a mechanic of skill in the construction of cars, to place them at the proper distance apart, without experiment or invention. It was also contended that the remoteness of the bearing carriages from each other, was not so described in the specification, as to

constitute any part of the improvement.

In respect to this branch of the case, the Court charged that the relative position of the bearing carriages to each other, in the construction of the car, was a material part of the arrangement of the patentee, and left the question to the jury whether or not he had sufficiently described the position of the trucks, having in view their distance apart, and also from the ends of the car body, suggesting at the same time, that the location must always depend, in a measure, upon the length of the body.

It will be seen, on looking into the specification, that the location of the trucks relatively to each other under the body, as well as the near proximity of the two axles of the truck to each other, form a most essential part of the arrange-

ment of the patentee in the construction of his cars.

Great pains have been taken to point out the defects in the existing four-wheel cars, and the impediments to be encountered and overcome in the running of cars upon rail-roads, as the latter are usually constructed. The patentee states, that in the construction of them, especially when of considerable length, it has been found necessary to admit of

lateral curvatures, the radius of which is sometimes but a few hundred feet, and that it becomes important, therefore, to so construct the cars as to enable them to overcome the difficulties presented by these curvatures, and to adapt them for running with the least friction practicable on all parts of the road. The friction referred to, is that which arises between the flanges of the wheels and the rails, causing great loss of power, and destruction of the wheels and rails, besides other injuries. For this purpose, he constructs two bearing carriages, each with four wheels, which are to sustain the body of the passenger or other car, by placing one of them at or near each end of it, as particularly described. The two wheels on either side of the truck are to be placed very near each other—the spaces between their flanges need be no greater than is necessary to prevent their contact with each other. The car body rests upon bolsters, supported on each of the two bearing carriages or four-wheel trucks, the bolsters so constructed as to swivel or turn on each other, like the two front bolsters of a common wagon. The body of the car may be made of double the length of the four-wheeled car, and is capable of carrying double its load. The truck may be so placed within the ends of the car as to bring all the wheels under it, or without the end, so as to allow the body to be suspended between the two bearing carriages. The patentee further states, that the closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of two bearing carriages, arranged as distant from each other as can conveniently be done for the support of the car-body, with a view to the objects and on the principles before set forth, is considered by him as an important feature of the invention; for, by the contiguity of the fore and hind wheels of each bearing carriage, while the two bearing carriages may be at any desirable distance apart, the lateral friction from the rubbing of the flanges against the rails is most effectually avoided, while at the same time all the advantages attendant upon placing the axles of a four wheeled car far apart are obtained. The two wheels on either side of the bearing carriages may, from their proximity, be considered as acting like a single wheel, and, as these two bearing carriages may be placed at any distance from each other, consistent with the required strength of the body of the car, it is apparent that all the advantages are obtained which result from having the two axles of a four-wheeled car at a distance from each other, while its inconveniences are avoided.

Among the principles stated by the patentee to be taken into consideration in the construction of the car is, that the greater the distance between the axles, while the length of the body remains the same, the less the influence of shocks and concussions occurring on the road; and hence the relief from them, when the trucks are placed under the extreme ends of the body, is greater than when placed midway between the centre and the end.

It is apparent from what we have already referred to in the specification, and still more manifest on a perusal of the whole of it, that the improvement in this part of the arrangement does not consist in placing the axles of the two trucks at any precise distance apart, in the construction of the car, or from each end of the body. The distance used must necessarily depend somewhat upon the length of the car and strength of the materials of which it is built, and hence it was impracticable to specify in feet or inches the exact distance from the ends of the car body at which it would be best to arrange the trucks. Neither do the advantages of a car, constructed and arranged as described, depend upon the trucks being placed at a specified distance from the ends, or so that there may be a specified distance between the axles. Having in view the defects in the existing cars, and other difficulties to be encountered, some considerable latitude may be allowed in this respect consistent with the object sought to be attained, to remedy the defects in the existing cars. All the principles for the construction of one, for the purpose of overcoming these difficulties, and remedying these defects, are particularly set forth in the description given by the patentee. We think the specification sufficient, and that the Court was right in the opinion expressed on this branch of the case. Any mechanic of skill could readily arrange the bearing carriages in connection with the body of the car, so as to secure the advantages so minutely and clearly pointed out, and which are shown to attend the practical working of cars constructed in the manner described.

III. The questions of originality and of infringement were questions of fact, and depending upon the evidence, and were properly submitted to the jury. We think the weight of it decidedly with the verdict.

IV. The patent in this case was originally issued 1st October, 1834, and was recorded anew 7th of June, 1837, according to the act of Congress of the 3d of March, 1837, (5 St. at Large, 191.) No drawings were attached to the

original patent, nor was there any reference therein to drawings. On the 25th of September, 1848, the patent was extended for the term of seven years from the 1st of October, 1848. The plaintiff gave in evidence, at the commencement of the trial, a certified copy of the patent and specification, certificate of the extension, drawing with references to the same, and an affidavit of the plaintiff made November 19, 1838. The drawing was not filed at the time the patent was recorded anew, but was filed on the 19th of November, 1838. The counsel for the defendants objected to the evidence, on the grounds—1st. That it appeared that no drawing was annexed to the original patent; and 2d, that the act of Congress did not make such a drawing evidence. The Court also instructed the jury, in summing up the case, that the drawing, a certified copy of which had been given in evidence, was to have the same force and effect as if it had been referred to in the specification, and was to be deemed and taken as part of the specification.

The first section of the act of 1837, provides that any person interested in a patent issued prior to the 15th of December, 1836, may, without any charge, have the same recorded anew, together with the descriptions, specification of claim and drawings annexed or belonging to the same; and it is made the duty of the Commissioner to cause the same, or any authenticated copy of the original record, specification or drawing which he may obtain, to be transcribed and copied into books of record kept for that purpose; and whenever a drawing was not originally annexed to the patent, and referred to in the specification, any drawing produced as a delineation of the invention, being verified by oath in such manner as the Commissioner shall require, may be transmitted and placed on file, or copied as aforesaid, together with the certificate of the oath, or such drawings may be made in the office, under the direction of the Commissioner in conformity with the specification.

The second section provides, that copies of such record and drawings, certified by the Commissioner, or, in his absence, by the chief clerk, shall be prima facie evidence of the particulars of the invention and of the patent granted therefor, in any judicial Court of the United States, in all cases where copies of the original record, or specification and drawings, would be evidence, without proof of the loss of such originals. This section also provides that no patent issued prior to the aforesaid 15th day of December, 1836, shall, after the first day of June then next, be received in evidence in any Court

on behalf of the patentee, unless so recorded anew, and a drawing of the invention, if separate from the patent, verified as aforesaid and deposited in the patent office. See, also, section third of the same act.

It is quite clear, upon the above provisions of the act, thathe Court was right in admitting the drawings, in connection with the patent and specification, in evidence. The whole together are made *prima facie* evidence of the particulars of

the invention and of the patent granted therefor.

The weight to be given to the drawings furnished under the act, by way of enlarging or explaining the description as given in the specification, is another question. That will depend upon the circumstances of each particular case. As a general rule, they will not be effectual to correct any material defect in the specification, unless it should appear that they correspond with one accompanying the original specification of the patent; otherwise, in case of discrepancy between the drawing and specification, the latter should prevail. Care must be taken to avoid imposition by the use of the newly furnished drawing, and for this purpose the specification will afford the proper correction, unless the plaintiff goes further and shows that it conforms to the one originally filed.

The charge that the drawing in this case was to have the same force and effect as if it had been referred to in the specification, and was to be deemed and taken as part of it, was, perhaps, too strong, as it respects the drawings furnished under the act of 1837. The principle is true as it respects those accompanying the original application for the patent, but can hardly be said to be applicable to the full extent stated, in the case of these newly furnished drawings. principle might open the way to imposition and fraud. suming that there is nothing but the oath of the party attesting that the drawing affords a true delineation of the invention, the specification should prevail in case of a material discrepancy. But, admitting the instruction in this respect not to be strictly correct, and that too much weight was given to the drawing, we do not see that it would have altered the result. The specification afforded a sufficient description of the invention independently of the drawing. Some slight additions that improved the working of the car, were open to some question, whether they were embraced in the specification, but they did not enter into the essence of the invention, or constitute any substantial part of the improvement. Time and experience usually indicate these

slight additions and alterations, and they should be regarded as consequential results, belonging to the inventor. It requires time and experience usually to perfect the machine, and improvements derived therefrom are justly due to him.

V. As to the prior use of the car Columbus and others, constructed by the patentee before he made application for his patent, we think the instruction of the Court correct. The law allows the inventor a reasonable time to perfect his invention by experiments; and these could be made in this instance only by putting the car in the service of those controlling lines of rail-roads. There were repeated failures in the experiments tried, and the cars abandoned before the perfection of the car described in the patent. These experiments and trials sufficiently account for the previous use set up by way of forfeiture of the invention.

Upon the whole, after a careful examination of the case, and of all the points made by the defendants on the argument, many of which have been noticed above, we are satisfied that the verdict is right, and that a new trial should be

denied.

In November, 1855, an action at law, brought by Ross Winans against The New-York and Harlem Rail-Road Company, in the Circuit Court of the United States for the Southern District of New-York, for an infringement of the foregoing Letters Patent, was tried before His Honor Mr. Justice Nelson and a jury, at New-York. The following was the charge of Judge Nelson to the jury on that trial:

Gentlemen of the Jury: The first question in this case is—what is the thing, the machine, or instrument which the plaintiff claims to have invented? It is essential to comprehend this, in order to ascertain whether it is new—never before known, or in public use; and is also essential to enable you to determine whether the cars used by the defendants are a violation of the patent. It will be necessary, therefore, in the first instance, to turn your minds to the patent and the description of the improvement claimed, and which is there to be found. The description, I think I may say, is one of unusual clearness and precision for instruments of this char-We have had no difficulty ourself in ascertaining from it the improvement as claimed by the patentee, as it defines not only the arrangement and construction of the car-the running gear and the body—but also the principles governing the same, and upon which the improvement is founded.

The patentee refers in the beginning to the numerous curvatures in the rail-roads of this country, the radius of which, in many instances, is but a few hundred feet, and to the friction arising between the flanges of the wheels and the rails, causing a loss of power, and destruction of both wheels and rails. He then refers to the high velocities on rail-roads by the modern improvements in locomotive engines, and the demand of public opinion—of the business interests of the country for this description of speed, and also to the consideration, that certain things in the construction of both roads and cars become important which were not, and would not have been, at the old rates of speed. He observes that the great momentum of the load and intensity of the shocks and concussions are among the things to be noted and provided for. The patentee then refers to the fact, that passenger and other cars, in general use upon rail-roads, have but four wheels, the axles of which are placed from 3½ to 5 feet apart, the distance being governed by the nature of the road upon which they are run, and other considerations. He then observes that, when the cars (meaning the four-wheeled cars) are constructed so that the axles retain their parallelism, and are at a considerable distance apart, there is, of necessity, a tendency in the flanges of the wheels to come in contact with the rails, especially on a curvature of a short radius, as the axles then vary more from the direction of the radii; and that, from this consideration, when taken alone, it would appear to be best to place the axles as near each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves, and the planes of the wheels to be more in the line of the rails. But there are other considerations, he says, that must not be overlooked in the construction of the car, namely, the increased force of the shocks from obstructions at high velocities; and he observes that the greater the distance between the axles, while the length of the body remains the same, the less is the influence of these shocks and concussions. In consequence of this, he says, a compromise is most commonly made between the evils resulting from a considerable separation and a near approach, as, by the modes of construction now (meaning then) in use in respect to the four-wheeled cars, one of the advantages which he has referred to must be sacrificed to the other. The patentee then refers to the fact that the lateral curvatures of the roads, together with their irregularities, create these difficulties—are at the foundation of these difficulties. It becomes very important, therefore, he observes, both as regards

comfort, safety and economy, to devise a mode of combining the advantages derived from placing the axles a considerable distance apart, with those of allowing them to be situated near to each other.

Now, gentlemen, this is a result to which the patentee arrives, after his discussion of the various difficulties to be encountered in the construction of the car, and it may be said to be the leading idea—the general principle—the fundamental principle, if you please-embodied in the eightwheel car, and which he has subsequently described. I will call your attention to it again, because it brings out the principle upon which the eight-wheel car has been constructed by the patentee. It tends, therefore, very much to develop the leading features—the controlling features of that construction. He says: It becomes very important, both as regards comfort, safety and economy, to devise a mode of combining the advantages derived from placing the axles at a considerable distance apart, with those of allowing them to be situated near to each other. He then refers to the attempt to overcome these difficulties by the use of coned wheels, and to the partial remedy thereby, but points out the failure of the use of those alone, under high velocity, to get rid of the embarrassment.

The patentee then explains the object of his invention, which, among other things, is to make such an adjustment or arrangement of the wheels and axles, as shall cause the body of the car or carriage to pursue a more even, direct and safe course than it does as cars are ordinarily constructed, both over the curved and straight parts of the road, by the *desideratum* of combining the advantages of the near and distant coupling of the axles, and other means which he has described.

He then describes the arrangement and construction of his car, which I will not take up your time in reading. It has been read so often, and so frequently illustrated and exemplified in the progress of this trial, that I have no doubt you are familiar with it. It will be found upon the copy of the patent which I have between folios 21 and 28. And then comes the claim. The patentee says, after describing the construction of his car:

"I do not claim as my invention the running of cars or carriages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried, more evenly upon a rail or other road, and for objects distinct in character from those which I have had in view, as herein before set forth. Nor have the wheels, when thus increased in number, been so arranged or connected with each other, either by design or accident, as to accomplish this purpose. What I claim, therefore, as my invention, and for which I ask a patent, is, the before described manner of arranging and connecting the eight wheels, which constitute the two bearing carriages, with a rail-road car, so as to accomplish the end proposed by the means set forth, or by any others which are analogous and dependent

upon the same principles."

The claim itself explains the improvement set up by the patentee. It is the arrangement and construction and adjustment of the eight-wheeled car, as described in his specification—the car as a whole. The patentee claims no right as inventor to any of the constituent parts of the car—the wheels, the axles, the peculiar construction or framing of the running gear of the bearing carriages, the contrivances by which they are connected together, the springs, the bolsters, the turning of them upon the centre, or the swiveling of the trucks—nothing of this is claimed as new on the part of the patentee. This is plain from the terms of the claim, which is the construction and arrangement and adjustment of these various parts into a car as a whole, combining the advantages which he has set forth, as he claims.

Now, it is proper to observe, that this improvement, as claimed by the patentee, is made upon the existing fourwheel car then in general use, and which, as has appeared in the progress of this trial, is still in use in England, and, probably, upon the Continent, unless they have adopted our eight-wheel cars, some specimens of which I have understood have been sent to the Continent. It will, therefore, be proper and useful for you to examine this four-wheel car as then in general use, and the evidence in respect to it. Models have been introduced and exemplified, and no doubt you understand it. But you should inquire into this fact, in order to ascertain whether or not the difficulties described by the patentee existed upon curved roads at great velocity—I mean as respected this four-wheel car then in use upon roads with high velocity and with short curves—and whether or not the eight-wheel car, as arranged and constructed by the patentee, is an improvement upon it. This is one of the questions in the case for your consideration, and, as to this, you will probably not have much difficulty. From the time they were first brought out in Baltimore—I mean the eight-

wheel cars—it is admitted on all sides, that they have generally taken the place of the previous four-wheel car, and their use soon spread throughout the rail-roads of the United States, and, for aught that appears before us in this trial, the first construction and arrangement, and adaptation of those eight-wheel cars to the rail-roads of this country was in Baltimore, and they were constructed and arranged for the Baltimore and Ohio Rail-Road Company, and the Washington Branch It was offered, it is true, to be shown, on the part of the defendants, that one—that is an eight-wheel car—was brought out in Massachusetts in 1838, but that fact, at that late day, affords no exception to the truth of the remark I have made: for the eight-wheel car, what is claimed by the patentee to be the perfected car, the car completed, and upon which the patent was founded, was made as early as the beginning of the winter—sometime in December, 1834—the Washington cars, some four years before the eight-wheel car in Massachusetts.

Now, gentlemen, if I have succeeded in explaining to you the improvement described in the plaintiff's patent, and claimed by him, upon these four-wheel cars, by the construction of an eight-wheel car, as I hope I have, the next question to which your attention must be called is this—whether or not this eight-wheel car, this improvement as thus described in the patent, and as first brought out in Baltimore—whether this was the improvement of the plaintiff. This is one of the material questions in the case, which, as you have already discovered, has been most seriously contested between the After calling to your minds the construction given parties. by the Court to the patent, and to what constitutes the improvement which is claimed to have been reduced to practical use—after you have ascertained and comprehended this improvement claimed by the plaintiff, and described in his patent—after this, which is a question of law, (I mean so far as the construction of the patent is concerned—) after you have ascertained what is claimed by the plaintiff as his improvement, the question whether or not he was the first inventor of it is a question of fact, which belongs to you to determine. The burden of the evidence—for the greater portion of the time, the long time which has been consumed in this trial has been directed on both sides to the solution of this ques-The patent of the plaintiff, given in evidence, and the extension of it for seven years, which has also been given in evidence, together with the testimony of the experts introduced on the part of the plaintiff in the opening of the case,

furnish prima facie evidence that the plaintiff was the first and original inventor of the improvement claimed, and of its utility; and, therefore, the burden of showing that he was not the first and original inventor, and of the inutility of the patent, rests upon the defendants. They are obliged to assume this position in that stage of the trial. Accordingly, they have gone into evidence at large for the purpose of satisfying you upon these points, and you have before you, first, the evidence from Baltimore, for the purpose of showing this—that, assuming the car described in the plaintiff's patent to be the improvement upon the four-wheel car, and that it was new and useful, yet the defendants insist, upon this evidence, that the plaintiff was not the first inventor, but that somebody else was. They refer to the timber, the wood and the trussel cars, and much evidence has been given in respect to these cars. The plaintiff, on the contrary, insists that neither of them embodied his improvement, or that if any of them did, it was constructed after his invention, which it is claimed is carried back upon the evidence to the fall or beginning of the winter of 1830. Now, gentlemen, I am not going over this evidence on either side. It has been so amply and ably discussed by the learned counsel upon both sides, that I cannot doubt that you are familiar with every material portion of it. It will be for you to say, upon the evidence, whether or not the defendants have furnished evidence to satisfy you that the plaintiff was not the first and original inventor, but that somebody else was. They have that burden upon them. It will be for you to determine, upon the whole of the evidence, whether they have overcome the patent, and the evidence furnished in support of it.

Then another ground is taken, viz., that there is nothing new in the arrangement or construction of the car, as described in the patent, but that it was old, and before in public use; and they say that it is to be found in Chapman's patent and drawings, and also in Tredgold and Fairlamb—although, as to the two latter, they are not much relied upon—in the Quincy car, in the Allen locomotive, and in the Jervis locomotive. All these have been brought out in the progress of the trial, and amply examined and discussed, and I am persuaded that you are entirely familiar with all the evidence bearing upon this branch of the case. The question upon it will be, whether or not you find the improvement of the plaintiff—the improvement existing in the arrangement and construction of his eight-wheel car upon the four-